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Marshall Star, February 22, 2012 Edition

MARSHALL STAR

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NASA Administrator Announces Senior Leadership Changes; Marshall Center Director Robert Lightfoot Named Acting NASA Associate Administrator

NASA news release

NASA Administrator Charles Bolden has announced changes to his senior leadership team. Associate Administrator Chris Scolese was named director of NASA's Goddard Space Flight Center. Robert Lightfoot, director of the Marshall Space Flight Center, will serve as acting associate administrator. Both will assume their new responsibilities March 5.

Scolese, who has been with NASA since 1987, succeeds Robert Strain, who announced his decision to return to private industry in January. Lightfoot joined NASA in 1989 as a test engineer and program manager at Marshall. Lightfoot's deputy, Gene Goldman, will serve as Marshall's acting center director.



Robert Lightfoot. (NASA/MSFC)

"Both Chris and Robert are dedicated public servants who have a passion for NASA and exploration," Bolden said. "We are fortunate to have such talented and experienced leaders who are capable of assuming these critical responsibilities during this important time."

As associate administrator, Lightfoot will be the agency's highest-ranking civil servant, responsible for oversight and integration of NASA's broad efforts in human spaceflight, science and aeronautics. At Goddard, Scolese will lead a major U.S. laboratory for developing and operating unmanned scientific spacecraft. Goddard manages many of NASA's Earth observation, astronomy and space physics missions. It was established in 1959 as NASA's first spaceflight facility.

"I am excited with the depth and diversity of experiences Chris and Robert will bring to their new roles," Bolden added. "I know the entire NASA family will wish them continued success as they begin these new challenges."



Chris Scolese. (NASA)

Scolese served as the agency's acting administrator in 2009 and was previously NASA's chief engineer. As chief engineer, Scolese was responsible for ensuring that development efforts and mission operations within the agency were planned and conducted on a sound technical and management basis. He also served as deputy associate administrator in the Office of Space Science at Headquarters and previously served as deputy director of Goddard, Earth Orbiting Satellite program manager, and deputy director of flight programs and projects for Earth Science.

Lightfoot began his NASA career as a test engineer and manager for the space shuttle main engine technology test bed program. He then served in leadership positions at Marshall, Stennis Space Center and Headquarters. In 1998, Lightfoot was named deputy division chief of Marshall's Propulsion Test Division. He joined Stennis in 1999 as chief of Propulsion Test Operations where he managed space shuttle main engine testing and multiple NASA, Department of Defense, and industry rocket engine test programs. From 2003 to 2005, he was assistant associate administrator for the Space Shuttle Program, Office of Space Flight, at Headquarters.

Both men are highly honored NASA leaders, earning the Presidential Rank Award of Meritorious Executive and agency medals for outstanding leadership.

For more information about NASA and agency programs, visit <http://www.nasa.gov>.

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Director's Corner: Thoughts As I Prepare For My New Job

I hope by now you've heard that NASA Administrator Charlie Bolden recently asked me to serve as Acting Associate Administrator at NASA Headquarters and that I accepted.

Starting March 5, I'll be responsible for oversight and integration of NASA's human space flight, science and aeronautics programs. It's a chance for me to make a contribution to NASA from a different level. I'm excited about the opportunity and honored by the trust that Charlie's placed in me.

At the same time, it's hard to leave Marshall. With the exception of a couple of tours at Stennis Space Center and Headquarters, I've spent my career here, and serving as center director has been my favorite job. We've been through some tough challenges together the last couple of years, and I couldn't be prouder of a bunch of folks for how you've come through it.

Today we have a fairly good budget to work with, a stable workforce, and interesting work to do, including the Space Launch System, International Space Station operations, and a growing list of science and technology projects.

We also have a great leadership team to carry Marshall forward. Gene Goldman will be acting center director, and I've told him to run the place like it's his. Robin Henderson and Dale Thomas will continue as associate directors, overseeing our

workforce, facilities, capabilities, projects and programs. The center is in great hands, and I know you'll give them your full support.

Thank you for your talents, your commitment, and your passion for space exploration and discovery. I look forward to continuing to work with you all in my new job.

Robert

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Message from the Center Director

As we continue to realign and transition the Marshall Space Flight Center to carry out NASA's bold and ambitious mission for a sustainable program of exploration and innovation, I am pleased to announce the following leadership changes, effective immediately.

- Steve Doering is reassigned from the position of director of the Michoud Assembly Facility to director of the Office of Center Operations. Mr. Doering succeeds Ms. Ann McNair who retired in January 2012.
- Chris Crumbly, currently Michoud deputy director, succeeds Mr. Doering as Michoud director. Concurrently, Mr. Crumbly will serve as chair of the Evaluation Board for the Advanced Booster Engineering Development and Risk Reduction procurement activity.
- Robert Champion is appointed to the Senior Executive Service position of Michoud deputy director.
- Brandon Brown is reassigned from the position of deputy chief financial officer to the position of associate director of Operations for the Engineering Directorate. Mr. Brown succeeds Mr. Steve Miley who resigned in December 2011.
- Jerry Cook, who previously held the dual role of associate program manager of the Space Launch System Program Office and manager of the SLS Program Planning & Control Office, is reassigned to the position of associate program manager of the SLS Program Office. Additionally, Mr. Cook will continue to act in the role of manager of the SLS Program Planning & Control Office, until a selection for that position is made.

I know I can count on you to give these individuals your full cooperation and support as they transition into their new roles and assume their new duties.

Robert

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Robert Champion Appointed to Senior Executive Service Position of Michoud Deputy Director

As a follow-up to the recent Key Personnel Announcements announcing Robert Champion's appointment as the Michoud Assembly Facility deputy along with three other reassignments, the Marshall Space Flight Center welcomes Champion to the Senior Executive Service. As Marshall's newest SES member, Champion joins the executive management team in leading the center in achieving the agency's mission of science and space exploration.

Champion has been selected to fill this key position based on his extensive experience in project management, systems engineering, strategic planning and program support across all levels of the agency. As Michoud deputy director, he will report to the Michoud director and will have day-to-day management responsibility of the 832-acre manufacturing installation with 3.8 million square feet of total infrastructure, including deep-water access. Additionally, he will market the facility's capabilities to NASA as well as government, university and private sector entities to build a broader business base. Currently the facility serves as home to several government and corporate entities, including the U.S. Department of Agriculture, Defense Contract Audit Agency, Defense Contract Management Agency, U.S. Coast Guard Integrated Support Command and the Lockheed Martin Corp., which is building spaceflight hardware for the Orion crew exploration vehicle, the successor to the space shuttle. Michoud also houses the National Center for Advanced Manufacturing, a partnership among

NASA, the state of Louisiana and the University of New Orleans, providing research, advanced manufacturing technology and material evaluation techniques for use in aerospace and commercial markets.

Champion has had a diverse career at Marshall, beginning in 1986 as a propulsion engineer in the Preliminary Design Office where he led numerous system development efforts. In 1994 he was promoted to lead engineer in the Propulsion Systems Branch and later moved to the X-34 Main Propulsion Design Team as the Main Propulsion System lead system engineer. As lead for the Vehicle Propulsion System Team from 1999 to 2000, Champion coordinated group support for such high-profile projects as the Chandra X-ray Observatory and the X-34 Main Propulsion System. From 2000 to 2001, he served as manager of Marshall's Internal Relations and Communications Department.

From 2001 to 2003, Champion managed the auxiliary propulsion project for the Next Generation Launch Vehicle Program and served as project manager for the Boeing Orbital Space Plane Project from 2003 to 2004. From 2004 to 2007, he served as deputy manager, chief engineer and technical manager in the Propulsion System Engineering & Integration Office in Marshall's Space Shuttle Propulsion Office. As division chief of the Stage Systems Engineering & Integration Division from 2007 to 2008, Champion managed three branches responsible for the integrated stage design, design process and functionality. From 2009 to 2010, he served on the Technical Staff of the Spacecraft and Vehicle Systems Department, managing the department's day-to-day technical activities.

Immediately prior to his new position, Champion served as Michoud chief operating officer, responsible for the design, operation and maintenance of the total facility; environmental management and occupational health; acquisition, operation and maintenance of institutional and program support equipment; information systems; the full range of logistic support services; technical information, documentation, directives and records management; industrial labor relations; and protective services for personnel, property and programs; and Contracting Officers Technical Representative for the site services contract.

In 2008, Champion was selected to participate in NASA's Senior Executive Service Candidate Development Program, a highly competitive program designed to develop a cadre of qualified men and women with a high potential for assuming executive responsibilities. He successfully completed the program and received certification from the Office of Personnel Management in 2010. During the course of this program, Champion completed two developmental assignments, one with Teledyne Brown Engineering as project manager of the Nuclear Manufacturing Division and one as a legislative affairs specialist in NASA's Office of Legislative and Intergovernmental Affairs.

Throughout his NASA career, Champion has been the recipient of numerous awards, including the NASA Medal for Exceptional Achievement, a Space Flight Honoree Award, a Director's Commendation and the NASA Contracting Officers Technical Representative of the Year Award. In 2001, he was selected for a NASA Fellowship to participate in the Creativity and Innovation in the Organization Program at the University of California in Los Angeles.

Champion earned his bachelor's degree in aerospace engineering from Auburn University in 1986. A native of Woodstock, Ala., he is married to the former Maria Speakes, has four children and resides in Huntsville.

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Marshall, Stennis Perform First J-2X Powerpack Test of the Year

Marshall Web feature

Engineers at the Stennis Space Center conducted an initial test of the J-2X engine powerpack Feb. 15, kicking off a series of key tests in development of the rocket engine that will carry humans deeper into space than ever before.

Image right: In a brief but dazzling display, a 1.86-second burst of flame emerges from the A-1 test stand at the Stennis Space Center the evening of Feb. 15, as NASA kicks off the first in a series of J-2X powerpack tests. (NASA/SSC)



This was the first of about a dozen various powerpack tests that will be conducted this year at Stennis. This initial test was designed to ensure powerpack and facility control systems are functioning properly. It also marked the first step establishing the start sequence for the powerpack tests and was the first time cryogenic fuels -- extremely low-temperature liquid hydrogen and liquid oxygen -- were introduced into the powerpack to ensure the integrity of the facility and the test article in preparation for full-power, longer-duration testing.

The powerpack is a system of components on the top portion of the J-2X engine, including the gas generator, oxygen and fuel turbopumps, and related ducts and valves. On the full J-2X engine, the powerpack system feeds the thrust chamber system, which produces engine thrust.

The J-2X is being developed by Pratt & Whitney Rocketdyne for the Marshall Space Flight Center. It is the first human-rated liquid oxygen and liquid hydrogen rocket engine to be developed in 40 years. The J-2X will provide upper-stage power for NASA's Space Launch System, a new heavy-lift vehicle capable of missions beyond low-Earth orbit.

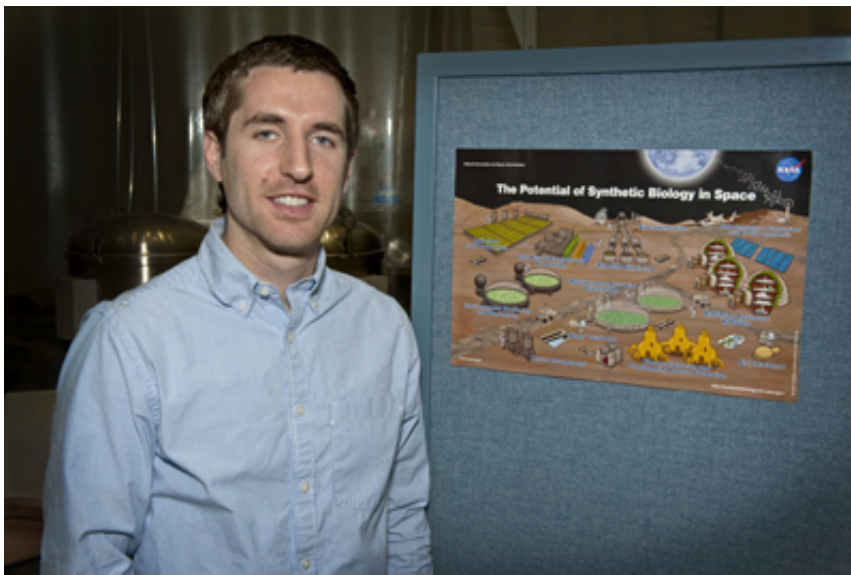
The new powerpack test series is the second for the J-2X engine. Testing of an Apollo-era powerpack at Stennis in 2008 provided critical data for development of the new, more advanced turbomachinery.

For more information about J-2X, visit http://www.nasa.gov/mission_pages/j2x/index.html.

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Space Synthetic Biology: How This New Initiative Can Help NASA Now and in the Future

By Jessica Eagan



So what is synthetic biology and what's in it for NASA?

Image left: Matt Mansell (NASA/MSFC/Fred Deaton)

Synthetic biology is the design and construction of new biological functions and systems not found in nature. The Marshall Space Flight Center and the Ames Research Center have been partnering on the [Space Synthetic Biology Project](#) and are working on new breakthroughs in this increasingly useful pursuit, which is part science discipline and part engineering. Led by Ames, the team is studying how this powerful

new tool can help NASA now and in the future.

Matt Mansell, a test engineer in the Environmental Control and Life Support Systems Development Branch of Marshall's Engineering Directorate, describes synthetic biology like this: "It's the breaking down of complex biological systems -- like the signaling pathways that cause your body to develop the way it does -- into standardized basic components. This enables biological engineers to build functions we need, quickly and affordably, from those well-defined and readily available parts. Just like an engineer can order standardized pumps, valves and wheels based on performance specifications, and quickly have them on hand and assemble them into a functioning system, so synthetic biology hopes to do the same for biological processes.

"As our understanding of biological systems increases," added Mansell, one of the team members working on the project, "synthetic biology will enable the use of the genetic code to write wholly new biological functions, much like we now use computer code."

NASA's Space Synthetic Biology Project was created to harness biology in reliable, robust, engineered systems to support the agency's exploration and science missions, to improve life on Earth and to help shape NASA's future. The program also is intended to contribute foundational tools to the synthetic biology research community.

Synthetic biology can enhance [NASA's mission](#) through green aviation and biofuels; enabling technologies such as spacecraft materials, life support, food, medicine and [in-situ resource utilization](#) for future exploration; and by experimentally studying the origin and evolution of life on Earth, alternate biologies for life elsewhere, the future of life and potentially Earth science as well.

"We already use and manipulate biology to produce food, pharmaceuticals, alternative fuels, clean water, construction materials and a range of other products," Mansell said. "Synthetic biology has the potential to expand that list of products and make those products more cheap and more effective, and could greatly decrease the time needed to develop new production systems.

"We may one day create a man-made microorganism from scratch to use electrical power to very efficiently convert carbon dioxide, wastewater and other undesirable materials into spacesuit materials, food, medicine and plastic containers," he added. "And some day, a space traveler's life will depend on the ability to produce highly complex biopharmaceuticals in space. One solution: You take the raw materials of DNA and some other essentials, and you can quickly grow an organism tailored to make just the medicine needed."

The project is focused on two applications of synthetic biology for NASA's mission: regolith-based biocomposites and

bioelectrochemical systems for life support. Mansell and a team of Marshall engineers have been tasked to conduct modeling and simulations, feasibility analyses and laboratory tests to support development of these technologies.

For regolith-based biocomposites, loose lunar or Martian soil is either solidified through biologically induced precipitation of a cement-like filler -- called biocementation -- or solidified by other methods. Biocementation occurs when carbonate secreted by microorganisms combines with calcium to form the mineral calcium carbonate. These biocomposites may serve as building blocks for habitats, sheet material for containers, or made in-place to serve as roadways and landing pads.

For bioelectrochemical systems, metabolic wastes and in-situ resources can be used to "fuel" microorganisms which produce electrical power or can be converted to beneficial materials using "electrically powered" organisms.

"With these bioelectrochemical systems, as with the non-biological life support technologies Marshall develops, a big goal is to recover useful mass from CO₂, urine, and other wastes to free up payload mass for scientific and exploration equipment," Mansell said. "Obviously, you have to supply water and oxygen to the crew, so we're taking that CO₂ and producing the water and oxygen we need from it, thereby saving that mass so we can use it for smaller vehicles with less fuel, or else to carry more scientific payload and more worthwhile payloads."

Mansell said that one day, synthetic biology could allow a genome to be created from scratch using only the functions needed; then the novel organism could be brought to life to provide the capabilities desired.

"These are all early phase technologies," Mansell said. "I hope to provide valuable analysis and design recommendations to create a solid foundation for the project to build on in coming years, developing prototypes and flight experiments. Synthetic biology represents a broad and powerful new toolset, so we want to make sure we're considering all the intricacies of application, and applying it where it can make a positive impact on space exploration."

Synthetic biology: Is it safe?

As far as the environmental, social and safety implications of synthetic biology, Mansell said researchers and regulators are not taking these concerns lightly. A number of studies have been done to identify risks and ensure proper methods of regulation. A [key report](#) in 2010, for example, presented by the Presidential Commission for the Study of Bioethical Issues, recommended limited regulation at this early stage and the need for ongoing discussion as the field develops.

"Synthetic biology is pretty new," Mansell said. "It's not really at a point yet where people can employ it for too many practical uses, but we're building up those capabilities. In my opinion, the benefits of synthetic biology will outweigh the potential problems. Biology is such a vast and still under-explored tool for solving the problems facing mankind. When resistors, capacitors and transistors were standardized, it only took a few decades until millions of people began carrying smart phones capable of accessing information from all over the world at any time. I'm fascinated by the possibilities of putting standardized biological functionalities into the hands of engineers, both on Earth and in space."

For more information about the Space Synthetic Biology Project, visit <http://syntheticbiology.arc.nasa.gov/>. To read more about the potentials of synthetic biology in space, visit http://event.arc.nasa.gov/main/home/reports/CP-2011-216430_Synthetic_Bio.v6.pdf. For more information about the Presidential Commission for the Study of Bioethical Issues, visit <http://bioethics.gov/>.

Eagan, an AI Signal Research Inc. employee and the Marshall Star editor, supports the Office of Strategic Analysis & Communications.

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This week marks a significant milestone in the history of American spaceflight. On Feb. 20, 1962, astronaut John Glenn became the first American to orbit the Earth. He circled the globe three times in his Friendship 7 space capsule. Dr. Wernher von Braun, the first director of the Marshall Space Flight Center, was among the NASA leadership that worked closely with Glenn on plans for the flight. Von Braun, right, and Glenn examine a model of a lunar landing stage at Marshall following Glenn's original flight. Visit <http://history.nasa.gov/friendship7/index.html> to see a biography of Glenn as well as other pictures related to his career with NASA. (NASA)



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Marshall's 2011 Combined Federal Campaign Declared a Success

By Megan Davidson



To mark the national Combined Federal Campaign's 50th anniversary, the Marshall Space Flight Center raised the goal for the 2011 campaign to \$700,000. The Marshall team not only met that challenging goal, but exceeded it by more than \$25,000.

Image left: As part of CFC Community Service Days, Marshall Center team members help distribute food at the Downtown Rescue Mission in Huntsville. (NASA/MSFC/Given)

The center's workforce raised \$728,398 for the annual campaign by the Dec. 16, 2011,

deadline. "When we set the center's goal at \$700,000, I knew we had a big challenge ahead of us," said Marshall Center Director Robert Lightfoot. "But I also knew that our team members would rise to that challenge, just like they've done selflessly year after year. Everyone should be really proud of achieving such an outstanding accomplishment and helping others in such a profound way. What a great way to celebrate 50 years of caring."

"The only reason we reached our CFC goal is because of the generosity of the Marshall workers who contributed," said Jim Duffy, 2011 Marshall CFC executive committee chairman. "It's a privilege and honor to work with people who care about helping the community."

Since the start of the campaign last Sept. 1, more than 140 Marshall team members also participated in eight bus tours to get a first-hand look at how their CFC contributions help participating charitable organizations -- like the Greater Huntsville Humane Society and the Huntsville Hospital Foundation.

"These tours gave some of our employees an excellent opportunity to see just a few of the wonderful charitable organizations that work to make our community a better place," said Gray Marsee, CFC bus tour chairman. "Many of our team members were inspired by these visits to either donate to these organizations for the first time or to continue their support. My hope is that the Marshall team will not only continue a great tradition of charitable giving, but we will also increase our support both through the CFC and through our own private giving and service," he added.



Image right: Siran Stacy, who played football for the University of Alabama in Tuscaloosa from 1989-1991, presented the keynote address during the Marshall Center's "Thanks For Giving: 50 Years of Combined Federal Campaign" rally last Nov. 1. In 2007, Stacy lost his wife and four of his five children when a drunk driver collided with their family van. Now he travels as a motivational speaker, sharing the importance of family, community and spirituality as healing forces in the face of tragedy. (NASA/MSFC/Given)

Some 386 Marshall team members also supported about 40 Community Service Days activities, volunteering more than 1,425 hours to serve meals, clean toys, paint wheelchair ramps and give their time to other projects that benefit those in need.



"Opportunities like Community Service Days offer two very large benefits to the charities and organizations involved," said Mallory Johnston, Marshall's CFC Community Service Days chairwoman. "Some participating organizations love having volunteers visit in hopes that they will want to continue to help the organization change the community. Perhaps when someone volunteers to serve meals at the Downtown Rescue Mission, they will learn that the mission served over 220,000 meals in 2011. This fact -- coupled with actually helping - - may spark a volunteer to become a monetary supporter of that organization.

Image left: During a CFC bus tour to the Huntsville Hospital Neonatal Intensive Care Unit, Marshall Center team members get a first-hand look at how their CFC contributions support the hospital's unit. (NASA/MSFC/Given)

"Another large benefit to organizations," Johnston added, "is the raw manpower a large group brings to a project. Volunteers painted more than 15 wheelchair ramps to increase the mobility and safety for some of the clients at CASA of Madison County. It shows that small actions multiplied by a lot of people equals big change." CASA -- Care Assurance System for the Aging and Homebound -- is a nonprofit agency in Huntsville that provides services to senior citizens and to homebound individuals of all ages that specifically address their special physical and emotional needs.

The Marshall Center's CFC effort is part of the Tennessee Valley Combined Federal Campaign -- a joint effort that also includes the Army's Aviation and Missile Command and other federal agencies at Redstone Arsenal and in surrounding Alabama and Tennessee counties. Marshall's donations went toward the Tennessee Valley-wide organization's goal of \$2.4 million.

Davidson, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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Marshall Black History Month Speaker Freeman Hrabowski: 'We Have to Find More Ways for Students to Get Involved in STEM Disciplines'

Freeman Hrabowski III, president of the University of Maryland, Baltimore County, speaks to Marshall Space Flight Center team members about the importance of innovation and collaboration in America's workforce, during Marshall's Black History Month program Feb. 16 in Morris Auditorium. He discussed the significance of engaging students to pursue science, technology, engineering and mathematics, or STEM, careers. Attracting and retaining students in STEM disciplines is a major NASA education goal. A native of Birmingham, Hrabowski serves as a consultant to the National Science Foundation, the National Institutes of Health, the National Academies, and universities and school systems nationally.



"Dr. Hrabowski spoke with such relevance on diversity, and went a step further as he challenged personal accountability in education, family and beyond," said program attendee Johnny Stephenson, deputy director of Marshall's Office of Strategic Analysis & Communications. The Black History Month program was sponsored by Marshall's Office of Diversity & Equal Opportunity. (NASA/MSFC/Given)

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Stanford University's Dr. C.W. Francis Everitt to speak about results of NASA's Gravity Probe B mission Feb. 23 at NSSTC, Feb. 24 at UAH



Dr. C.W. Francis Everitt
(<http://www.stanford.edu/>)

Dr. C.W. Francis Everitt, a professor at Stanford University in California, will speak to Marshall Space Flight Center team members at 1:30 p.m., Feb. 23, at the National Space Science and Technology Center, Room 2096. He will discuss the results of [NASA's Gravity Probe B mission](#), and the ability of humankind to use space and space hardware as a test-bed for fundamental physics and general relativity.

Gravity Probe B is one of the longest running projects in NASA's history. The experiment, launched in 2004, is a physics mission to experimentally investigate Albert Einstein's 1916 General Theory of Relativity.

Everitt also will discuss the results at a public colloquium at 2 p.m., Feb. 24, at the University of Alabama in Huntsville's University Center Exhibit Hall.

A reception will follow the UAH event and a RSVP is required. To reserve a seat, email rsvp@uah.edu or call 256-824-6063. Visit <http://www.uah.edu/map>, number 7, to locate the University Center Exhibit Hall.

Find this article at:

<http://www.nasa.gov/centers/marshall/about/star/star120222.html>